REMARKS/ARGUMENTS

Claims 43-53 are active. Minor revisions have been made to the claims as suggested by the Examiner. Claims 43, 45, 46, 48 and 49 have been revised to refer to "w/w% based on dry weight"; and claims 50-51 have been revised to include the phrase "in said inulin". Claim 50 has been revised to add the indefinite article "a". Accordingly, the Applicants do not believe that any new matter has been introduced or that any new issues would be raised by these revisions.

Restriction/Election

The Applicants previously elected with traverse **Group VI**, claims 30-33, directed to a process for purifying DFA III solution. Claims 1, 4-6, 13-26, 29 and 35-42 have been withdrawn from consideration. The requirement has been made FINAL. The Applicants respectfully request that the claims of the nonelected groups which depend from or otherwise include all the limitations of an allowed elected claim, be rejoined upon an indication of allowability for the elected claim, see MPEP 821.04.

Objections—Claims

Claims 43 and 50 were objected to for using particular terminology. The Applicants believe these objections are now moot in view of the amendments above. Claim 43 has been revised to consistently refer to "w/w%" values. Claim 50 has been amended to add the indefinite article "a".

Rejection—35 U.S.C. §112, second paragraph

Claims 43-53 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Applicants respectfully request the withdrawal of this rejection in view of the amendments above and the remarks below.

Claim 43 employs the term "R-Bx" which is disclosed on page 9 of the specification (eighth line from bottom). This term refers to Brix as calculated using a refractometer and not by the specific gravity method. The method of measuring Brix must be specified since the two methods yield slightly different results due to measurement of the dissolved sugar content by the refractometric method and measurement of all dissolved solids by the specific gravity method, see http://en.wikipedia.org/wiki/Brix (attached). Claims 50-51 which both employ the phrase "polymerization degree of fructose" has been amended as suggested by the Examiner. Accordingly, this rejection may now be withdrawn.

Rejection—35 U.S.C. §103(a)

Claims 43, 45, and 47-53 were rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka, JP 49-117688 (English abstract, "AP" or English translation "N") or Uchiyama, U.S. Patent No. 5,057,418, or Tomita, "N" English abstract of JP 03-259090; and in view of Armarego, Purif. Lab. Chem. 4th ed., Ch. 1, pages 1-3. The Applicant respectfully traverse this *prima facie* rejection because the prior art does not suggest or provide a reasonable expectation of success for the present invention.

Tanaka, Uchiyama, Tomita, and Armarego do not disclose or suggest contacting a DFA III (difructose dianhydride III[1]) containing solution having a purity of less than 70% with activated carbon particles in the range of 15-200 microns added in an amount of 5% or less.

[1] DFA III is a practically indigestible disaccharide having a solubility of approximately 90-95% of sucrose and a sweetness of about 52% that of sucrose, specification, bottom of page 1.

Tanaka describes a method for manufacturing difructose dianhydride III ("DFA III") by extraction of burdock root (bottom of page 6 of the English translation), microbial treatment, and subsequent adsorption of a resulting extract on "an active carbon column" (page 7, line 16) and elution using an aqueous ethanol solution (see also Practical Example 2 on page 8 in which Jerusalem artichoke is extracted). Tanaka employs the activated carbon column to remove DFA III from the treated extract, wash it, and then concentrate it by eluting the DFA III from the column. The Tanaka process is similar to the prior art process described at the bottom of page 7 of the specification in which "impurities such as pigments are non-selectively adsorbed once on active carbon". Tanaka does not disclose contacting a DFA III solution having a purity of at least 60 w/w% and an R-Bx of 10 or more with active carbon particles. On the other hand, the process of the invention removes non-DFA III impurities by contacting them with active carbon particles, see the top of page 8 of the specification. The prior art DFA III contains these impurities since it has not been treated with particles of active carbon.

Uchiyama also describes a process for preparing DFA III involving similar steps of binding crude DFA III to active carbon and then eluting it with aqueous ethanol (col. 6, lines 29-31. Like Tanaka, it does not disclose or suggest contacting a DFA III solution having a purity of at least 60 w/w% and an R-Bx of 10 or more with active carbon particles.

Tomita (English abstract) describes treatment of a microbially-treated inulin solution by filtration, concentration, extraction and concentration, but also does not disclose or suggest contacting a DFA III solution having a purity of at least 60 w/w% and an R-Bx of 10 or more with active carbon particles.

Armarego is a general reference which teaches "common physical techniques used in purification". The rejection cites page 12 which indicates that during recrystalization procedures:

> If the solution contains extraneous coloured material like to contaminate the crystals, this can often be removed by adding some activated charcoal (decolorizing carbon) to the hot, but not boiling, solution which is then shaken frequently for several minutes before being filtered.

Significantly, Armarego is silent with respect to the effects of activated charcoal addition on DFA III and the rejection does not indicate whether the other prior art documents indicated DFA III preparations contain extraneous coloured material. Moreover, none of the cited prior art provides a reasonable expectation of success that the addition of active carbon particles would, in fact, either remove extraneous colored material from DFA III or other contaminants, such as those associated with undesirable smell of conventional DFA III preparations (specification, page 3, lines 6 *ff.*).

Furthermore, as alluded to above, the prior art teaches away from the invention, because the prior art chromatography methods pass DFA III through activated carbon columns which do not remove contaminants associated with the undesirable smell (specification, page 2, last paragraph, *ff.*). Based on the prior art cited in the rejection, one of ordinary skill in the art at the time of invention would have assumed that selective removal of such contaminants using activated carbon particles would not have been possible. The rejection does not indicate in the face of such prior art teachings, why one of ordinary skill in the art would have been motivated to use active carbon particles to further purify DFA III. On the other hand, the inventors have discovered that addition of a small amount (5% or less) of active carbon particles selectively remove undesirable contaminants from a DFA III solution. There is no suggestion or reasonable expectation of success for this in the prior art. Accordingly, the Applicants respectfully request that this rejection be withdrawn.

Conclusion

In view of the amendments and remarks above, the Applicants respectfully submit that this application is now in condition for allowance. An early notice to that effect is earnestly solicited.

Respectfully submitted,

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Brix

From Wikipedia, the free encyclopedia

Degrees Brix (symbol °Bx) is a measurement of the mass ratio of dissolved sugar to water in a liquid. It is measured with a saccharimeter that measures specific gravity of a liquid or more easily with a refractometer. A 25 °Bx solution is 25% (w/w), with 25 grams of sugar per 100 grams of solution. Or, to put it another way, there are 25 grams of sucrose sugar and 75 grams of water in the 100 grams of solution.

Contents

Brix, Balling, Plato

The Balling scale was developed by German chemist Karl Balling. It refers to the concentration of a dissolved solids (mostly sucrose) , as the weight percentage sucrose at 17.5°C.

The Brix scale was originally derived when Adolph Brix recalculated Balling's scale to a reference temperature of 15.5°C. The Brix scale was subsequently recalculated again, and now uses a reference temperature of 20°C. Brix can be approximated as 261.3*(1 - 1/g), where g is the specific gravity of the solution at 20°C.

The Plato scale which measures in Plato degrees is also a refinement of the Balling scale. It uses a reference temperature of 17.5°C and a slightly different modulus, with the approximation 260*(1 - 1/g), where g is the specific gravity of the solution at 17.5°C.

The three scales are often used interchangeably since the differences are minor.

- Brix is primarily used in fruit juice, wine making and the sugar industry.
- Plato is primarily used in brewing.
- Balling appears on older saccharimeters, and is still used in the South African wine industry.

Usage

Brix is used in the food industry for measuring the approximate amount of sugars in fruits, vegetables, juices, wine, soft drinks and in the sugar manufacturing industry. Different countries use the scales in different industries; in the UK brewing is measured with specific gravity X 1000, European brewers use Plato degrees, and US industries use a mix of specific gravity, Brix, degrees Baumé and Plato degrees.

For fruit juices, one degree Brix is about 1-2% sugar by weight. This usually correlates well with

perceived sweetness.

Since Brix is related to the concentration of dissolved solids (mostly sucrose) in a fluid it is therefore related to the specific gravity of the liquid. Because the specific gravity of sucrose solutions is well known, it can also be measured by refractometers.

Modern Brix meters are digital refractometers that calculate the Brix value based on refractive index. These meters are typically portable, splashproof and very simple to use, so that they can be operated by anybody directly on location. More and more often Brix is measured to determine ideal harvesting times of fruit and vegetables so that products arrive at the consumers in a perfect state or are ideal for subsequent processing steps such as vinification.

A Brix-measuring instrument for use in the vineyard

Scientific usage

When a refractometer is used, it is correct to report the result as "refractometric dried substance" (RDS). One might speak of a liquid as being 20 °Bx RDS. This is a measure of percent by weight of TOTAL dried solids and, although not technically the same as Brix degrees determined through a specific gravity method, renders an accurate measurement of sucrose content since the majority of dried solids are in fact sucrose. When an infrared Brix sensor is used, it measures the vibrational frequency of the sugar molecules, giving a Brix degrees measurement. This will not be the same measurement as Brix degrees using a density measurement because it will specifically measure dissolved sugar concentration instead of all dissolved solids.

References

- Boulton, Roger; Vernon Singleton, Linda Bisson, Ralph Kunkee (1996). *Principles and Practices of Winemaking*. Chapman & Hall. ISBN 0-412-06411-1
- Rene Martinez VitalSensors Technologies LLC. "VS1000B Series In-Line Brix Sensors for the Beverage Industry (http://www.vitalsensorstech.com/VS-1000B%20Brix%20Sensor%20Data%20Sheet.pdf)".— Martinez describes the theory and practice of measuring brix on-line in beverages.

See also

- Baumé scale
- Oechsle scale
- polarimetry
- Sweetness of wine

External links

Specific Gravity Resources:

- Brix to Specific Gravity Table (http://www.fermsoft.com/gravbrix.php)

- Brix, Plato, Balling, Specific gravity (http://byo.com/mrwizard/730.html)
- brix in orange juice measurement (http://www.abecitrus.com.br/english/faqs_us_resposta.asp?cod=96)

Categories: Oenology | Scales